Forest Health Protection
Pacific Southwest Region

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To: Sharon Heywood, Forest Supervisor, Shasta-Trinity National Forest

Subject: Insect and disease evaluation of silvicultural certification stands 160 and 161 in Elk Flat LSR for Craig Sewell (FHP Report Number N09-09)

At the request of Craig Sewell, Presale Forester, and Deborah Fleming, Silviculturist, Shasta-Trinity National Forest, Cynthia Snyder, Forest Health Protection (FHP) Entomologist and Pete Angwin, FHP Plant Pathologist, conducted a field evaluation of stands 160 and 161 of the Elk LSR Project on July 9, 2009. The objective of the visit was to evaluate the current forest health conditions within the stands, discuss what influence these conditions have on stand management objectives and provide recommendations as appropriate. Craig Sewell, who participated in the evaluation, will use this information to support the silvicultural prescriptions he is preparing to fulfill requirements for his certification as a silviculturist in Region 5.

STAND 160 (Sec. 28 and 33, T41N, R1W, Mt. Diablo Meridian)

Background

Stand 160 is 37 acres located within the Elk Flat LSR adjacent to Elk Flat Meadow on the Shasta-McCloud Management Unit, Shasta-Trinity National Forest, 11 miles northeast of the town of McCloud at an elevation of around 4,000 feet. Precipitation for the site averages 49 inches per year. Stand 160 is a white fir mixed conifer type with white fir (*Abies concolor*) the dominant species with pockets of ponderosa pine (*Pinus ponderosa*), and scattered sugar pine (*Pinus lambertiana*), incense cedar (*Calocedrus decurrens*) and Douglas-fir (*Pseudotsuga menziesii*). Canopy cover appeared to be approximately 70%. The understory is comprised of predominantly white fir with some ponderosa pine and incense cedar occurring in places. S-type annosus root disease (*Heterobasidion annosum*) was found on true fir.

The current average basal area is 246 sq.ft./acre and the stand density index (SDI) is approximately 361 with approximately 145 trees per acre. The stand was selectively logged102-112 years ago. The stand was naturally regenerated after the initial harvest. Elk Flat was designated as Late Successional Reserve in 1994.

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Late Successional Reserves are to be managed to protect and enhance conditions of late Successional and old growth forest ecosystems, which serve as habitat for related species including the northern spotted owl. Important structural attributes include live old growth trees, standing snags, fallen logs on the forest floor and in streams, multiple canopy layers, canopy gaps and patchy understory. The objectives of managing stand 160 are to bring the stand back into a more natural LSR state that might have been found prior to settlement by increasing species diversity.

The treatment recommendations for this stand are: 1) carry out six group selection cuts totaling twelve acres; 2) thin the remainder of the stand to a residual basal area of 150 sq.ft./acre or an SDI below 230; and, 3) remove slash. Radial clearing around large diameter sugar pine is also planned.

Observations

S-type annosus root disease was found infecting true fir in stand 160. The presence of this disease was confirmed by the presence of fruiting bodies of *H. annosum* found in some widely scattered white fir stumps (Figure 1) and scattered groups of blowdown exhibiting laminate decay in the roots. The presence of slow-growing tops on many understory and intermediate white fir suggests that *H. annosum* is fairly widespread within the stand. Fir engraver beetles, *Scolytus ventrallis*, which were present in dead and dying white fir (Figure 2), often follow root disease as it stresses the host. S-type annosus affects true fir, hemlock and giant sequoia. No P-type (pine-type) annosus was found.

Figure 1. Annosus conk in white fir.

Figure 2. Scolytus galleries in white fir.

Pockets of ponderosa pine mortality were found throughout the stand. Upon investigation it was determined that western pine beetle (*Dendroctonus brevicomis*) was active in the upper bole (Figure 3) and red turpentine beetle (*Dendroctonus valens*) was active in the lower bole (Figure 4) of all affected trees.

Figure 3. Woodpecker flaking off Bark as evidence of western pine beetle.

Figure 4. Pitch tubes of red turpentine beetle.

Discussion and Recommendations

Insect and disease-caused tree mortality is occurring in Stand 160, as evidenced by pockets of annosus root disease in white fir and pockets of western pine beetle and red turpentine beetle in mature ponderosa pine.

The proposed thinning to approximately 150 sq.ft./acre basal area, or an SDI less than 230, should improve the vigor of residual trees in Stand 160. An option for treating S-type root disease centers is the removal of all host trees. Small group selection removals could be utilized to clear annosus root disease centers of all S-type annosus host trees prior to planting non-susceptible seedlings, such as ponderosa and sugar pine and incense cedar.

In addition to the proposed thinning to 150 sq.ft./acre basal area, circular clearing of trees less than 30" dbh from around selected large diameter sugar pine is planned. Trees and shrubs should be cleared to outside the drip-line a sufficient distance to free up moisture needed to keep the sugar pine vigorous during droughts. This clearing will also remove ladder fuel which can carry ground fire to the crowns of larger trees.

In order to prevent *H. annosum* spores from infecting healthy conifer stumps and roots, it is recommended that a registered borate compound be applied to all freshly cut conifer stumps greater than or equal to 14" dbh. Borax has been proven effective in preventing stump infection by *H. annosum*. Since borate is a preventative treatment, treating stumps of infected true fir will only limit new infections, not cure the disease.

STAND 161 (Sec. 30, T41N, R1W, Mt. Diablo Meridian)

Background

Stand 161 is 35 acres very near Stand 160. This stand was chosen to contrast the insect and disease conditions of Stand 160 and as such was relatively healthy. Current basal area is 284 sq.ft./ac. with an SDI of 452. Logging history is thought to be from 1896 to 1907, the same time period as stand 160. The planned treatment is a thinning

to 4" DBH to reduce the stand density to a basal area of 125-150 sq.ft./ac., thereby reducing bark beetle risk and improving forest health.

Observations
Stand 161 is generally free of insect and disease-caused tree mortality. The exception is possible white pine blister rust affecting some branches of a sugar pine near what appears to be an old access road and a small pocket of western pine beetle and red turpentine beetle in ponderosa pine with about three trees affected.

Discussion and Recommendations
The proposed thinning to approximately 150 sq.ft./acre basal area, or an SDI less than 230, should improve the vigor of residual trees in Stand 161.

In addition to the proposed thinning to 150 sq.ft./acre basal area, circular clearing of trees less than 30" dbh from around selected large diameter sugar pine should be considered as in Stand 160. Trees and shrubs should be cleared to outside the drip-line a sufficient distance to free up moisture needed to keep the sugar pine vigorous during droughts. This clearing will also remove ladder fuel which can carry ground fire to the crowns of larger trees. Since annosus root disease is in the area, additional considerations may include treating all stumps greater than or equal to 14" dbh with a registered borate product.

Summary for Stands 160 and 161
When planning thinning treatments, it should be recognized that the target stand density is an average to be applied across the landscape and some variability may be desired. Individual high value trees, such as mature sugar pine, should benefit by having the stocking around them reduced to lower levels. In addition, when selecting trees for removal, preference should be given to trees infected with root disease and trees infested with bark beetles. Group selections could be utilized to clear annosus root disease pockets of true fir so that they can be planted with species not a host to S-type annosus.

If you have any questions regarding this report and/or need additional information please contact Cynthia Snyder at 530-226-2437 or Pete Angwin at 530-226-2436.

/s/ Cynthia Snyder

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